

REMARKS

In accordance with the foregoing, claims 1, 24, and 26 have been amended. No new matter is presented in this amendment.

Claims 1-29 are pending, with claims 1, 8, 15, and 22-24 being independent. Claims 5 and 23 are withdrawn from consideration as being directed to the elected invention of Group I but not being readable on the elected species of Species II (Fig. 4). Claims 8-22 are withdrawn from consideration as being directed to the non-elected invention of Group II.

Holding of Non-responsiveness

In the Office Action of January 19, 2005, claims 1-4 and 6-7 were under consideration as being directed to the elected invention of Group I and being readable on the elected species of Species II (Fig. 4).

In the amendment of April 19, 2005, claim 1 was amended to recite further features of the invention, and new claims 24-29 were added to recite the invention in different terms.

In the Office communication of July 7, 2005, the Examiner held the amendment of April 19, 2005, to be non-responsive, stating as follows:

The amendment filed on April 19, 2005 presenting only claims drawn to a non-elected invention/species is non-responsive (MPEP § 821-03). The remaining claims are not readable on the elected invention because the elected species (Figure 4) clearly shows the adjacent primary grain boundaries that are not parallel to each other do contact each other. The claim as amended appears to read on the species of Figure 6, not Figure 4.

The basis for the holding of non-responsiveness is apparently the language adjacent primary grain boundaries that are not parallel to each other and do not contact each other in amended independent claim 1 presented in the amendment of April 19, 2005. However, it is noted that new independent claim 24 presented in the amendment of April 19, 2005, did not contain the adjacent limitation, but recited simply primary grain boundaries that are not parallel to each other and do not contact each other.

In any event, independent claims 1 and 24 have been amended in the present amendment to delete the phrase and do not contact each other which apparently led to the holding of non-responsiveness, and have been further amended to recite further features of the

invention. Claim 26 has been amended solely to improve its form.

It is submitted that independent claims 1 and 24 as amended by the present amendment and claims 2-4, 6-7, and 25-29 depending therefrom are directed to the elected invention of Group I and are readable on the elected species of Species II (Fig. 4). Accordingly, it is respectfully requested that claims 1-4 and 6-7 be reconsidered and that new claims 24-29 be considered.

Objection to the Drawings

In the Office Action of January 19, 2005, the Examiner objected to the drawings on the grounds that Figs. 1A-1D should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. This objection is respectfully traversed.

Figs. 1A-1D are not believed to constitute "prior art" as that term is defined by either 35 USC 102 or 35 USC 103. Rather, these drawings are simply abstract representations of the art prepared by the Applicants in an effort to illustrate the Applicants' discovery of problems which plague the art; this discovery itself, together with the Applicants' abstraction of the art represented by Figs. 1A-1D, is part of Applicants' invention. Figs. 1A-1D are therefore the Applicants' work product and represent the Applicants' effort to describe the invention in terms of both the problems which have plagued the art and the manner in which the Applicants have addressed these problems with the invention defined by the claims. In light of this, it is respectfully requested that the objection to the drawings be withdrawn.

Claim Rejections Under 35 USC 102

In the Office Action of January 19, 2005, claims 1-4 and 6 were rejected under 35 USC 102(e) as being anticipated by Jung (U.S. Patent No. 6,755,909). This rejection is respectfully traversed.

Claim 1 as amended in the present amendment reads as follows:

A polycrystalline silicon thin film to be used in display devices, the thin film comprising adjacent primary grain boundaries that are not parallel to each other, wherein an area surrounded by the primary grain boundaries is larger than $1 \mu\text{m}^2$, and grains of polycrystalline silicon extend in a plurality of directions in the area

from each of the primary grain boundaries.

Therefore, in the polycrystalline silicon thin film now recited in claim 1, grains of polycrystalline silicon extend in a plurality of directions in the area from each of the primary grain boundaries that surround the area. This allows the fabrication of a polycrystalline silicon thin film having various shaped microstructures.

This is in direct contrast to the polycrystalline silicon disclosed in Jung. Jung discloses a method of sequential lateral solidification using a mask having four different transmission areas comprising horizontal or vertical stripes, wherein two areas of vertical stripes are offset relative to one another, and two areas of horizontal stripes are offset relative to one another (Fig. 4). This mask is shifted so that each area of the mask is moved to the next region of the silicon film during each lateral shift (column 6, lines 16-29). The resulting silicon film is illustrated in Fig. 5D, in which primary grain boundaries form square shapes in which the polycrystalline silicon grains are formed (column 7, lines 13-23).

However, unlike the polycrystalline thin film disclosed in claim 1 of the present application, the grains of polycrystalline silicon do not extend in a plurality of directions from each of the primary grain boundaries. To the contrary, Fig. 5D clearly shows that the polycrystalline silicon grains in the disclosure of Jung all extend in a common direction, and therefore would only extend in one direction from each of the primary grain boundaries. This is supported by the disclosure of Jung, which states that "by repeating the foregoing process, polycrystalline silicon having large and relatively uniform grains is created" (column 7, lines 24-26).

Although apparently not discussed in Jung, there would seem to be some areas bounded by primary grain boundaries at the bottom of Fig. 5D in which polycrystalline silicon grains extend in two different directions within the same bounded area. Nevertheless, even in these areas, the polycrystalline silicon grains do not extend in different directions from each of the primary grain boundaries defining the area.

Therefore, Jung does not disclose a polycrystalline silicon thin film in which grains of polycrystalline silicon extend in a plurality of directions in the area from each of the primary grain boundaries as recited in claim 1. Accordingly, Jung does not disclose every element of the Applicant's claim 1. In order for a reference to anticipate a claim, the reference must teach each and every element of the claim (MPEP 2131). Therefore, since Jung does not disclose the feature of independent claim 1 discussed above, it is submitted that claim 1 patentably

distinguishes over Jung in the sense of 35 USC 102(e), and it is respectfully requested that the rejection of claim 1 under 35 USC 102(e) as being anticipated by Jung be withdrawn.

Claims 2-4 and 6 depend from claim 1 and include all of the features of claim 1 plus additional features which are not taught or suggested by Jung. Therefore, it is submitted that claims 2-4 and 6 also patentably distinguish over Jung in the sense of 35 USC 102(e), and it is respectfully requested that the rejection of claims 2-4 and 6 under 35 USC 102(e) as being anticipated by Jung be withdrawn.

Claim Rejections Under 35 USC 103

In the Office Action of January 19, 2005, claim 7 was rejected under 35 USC 102(e) as being anticipated by Jung or, in the alternative, under 35 USC 103(a) as being obvious over Akimoto et al. (Akimoto) (U.S. Patent Application Publication No. 2003/0197666) in view of Jung. This rejection is respectfully traversed.

As discussed in the preceding section of this amendment, claim 1 patentably distinguishes over Jung in the sense of 35 USC 102(e). Furthermore, claim 7 depends indirectly from claim 1 and includes all of the features of claim 1 plus additional features which are not taught or suggested by Jung. Therefore, it is submitted that claim 7 also patentably distinguishes over Jung in the sense of 35 USC 102(e).

Also, Akimoto merely discloses an electroluminescent device comprising a thin film transistor with a polycrystalline silicon thin film active layer, and does not cure the deficiencies of Jung with respect to claim 1 as discussed in the preceding section of this amendment. Therefore, claim 7 also patentably distinguishes over the combination of Akimoto and Jung in the sense of 35 USC 103(a).

Thus, for at least these reasons, it is submitted that claim 7 patentably distinguishes over Jung and Akimoto in the sense of 35 USC 102(e) and 103(a), and it is respectfully requested that the rejection of claim 7 under 35 USC 102(e) as being anticipated by Jung or, in the alternative, under 35 USC 103(a) as being obvious over Akimoto in view of Jung be withdrawn.

New Claims 24-29

New claims 24-29 were added in the amendment of April 19, 2005, to recite the invention

in different terms. Claims 24 and 26 have been amended in the present amendment.

Claim 24 as amended in the present amendment reads as follows:

A polycrystalline silicon thin film to be used in display devices, the thin film comprising adjacent primary grain boundaries that are not parallel to each other, wherein an area surrounded by the primary grain boundaries is larger than $1\text{ }\mu\text{m}^2$, and polycrystalline silicon grains extend to the primary grain boundaries from an amorphous silicon portion in the area.

Neither Jung nor Akimoto discloses a polycrystalline thin film comprising adjacent primary grain boundaries that are not parallel to each other, wherein polycrystalline silicon grains extend to the primary grain boundaries from an amorphous silicon portion in the area.

Therefore, it is submitted that claim 24 patentably distinguishes over Jung and Akimoto in the sense of 35 USC 102(e) and 103(a), and an indication to that effect is respectfully requested.

New claims 25-29 depend from claim 24 and include all of the features claim 24 plus additional features which are not taught or suggested by Jung and Akimoto. Therefore, it is submitted that claims 25-29 also patentably distinguish over Jung and Akimoto in the sense of 35 USC 102(e) and 103(a), and an indication to that effect is respectfully requested.

Conclusion

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.


Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this paper, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

STEIN, MCEWEN & BUI, LLP

Date: 08/05/05

By: 
Randall S. Svihla
Registration No. 56,273

1400 Eye St., NW
Suite 300
Washington, D.C. 20005
Telephone: (202) 216-9505
Facsimile: (202) 216-9510